

Application No.: 09/779,440

**REMARKS**

The indication of allowable subject matter in claims 2-7 is acknowledged and appreciated. In view of the following remarks, it is respectfully submitted that all claims are in condition for allowance.

Claim 1 stands rejected under 35 U.S.C. § 103 as being unpatentable over Johnson et al. '452 ("Johnson") in view of the article published by Collberg et al. ("Collberg"). This rejection is respectfully traversed for the following reasons.

The Examiner admits that Johnson does not disclose or suggest the generation of key data wherein encrypted circuit design data does not operate as targeted without inputting the key data. The Examiner therefore relies on Collberg as allegedly obviating the deficiencies of Johnson and thereby modifies Johnson with the teachings of Collberg in an attempt to reach the novel invention recited in claim 1. However, it is respectfully submitted that the teachings of Collberg are completely unrelated to the present invention. Indeed, the Examiner's reliance thereon is not entirely understood.

As a preliminary matter, the disclosed opaque predicates of Collberg are directed to software source code and are completely unrelated to LSI design. In this regard, it is noted that the predicates of Collberg *form part of the code* by being inserted therein as irrelevant code, and are used to assist the code *transformation* so as to hide the protected program from deobfuscators. As shown in Figure 4 of Collberg, the predicates create alternative paths to make it more difficult for a reverse engineer to determine the correct code. Indeed, only Figure 4C illustrates a bugged code S<sup>b</sup>, which is nonetheless *never accessed* because the predicate is set to always select the correct version of the code S<sup>a</sup> (section 4.2, last three lines of Collberg).

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In this regard, the Examiner's reliance on the opaque predicates shown in Figure 4C of Collberg as the claimed key data is respectfully traversed. Claim 1 recites in pertinent part, "wherein the encrypted circuit design data does not operate as targeted without inputting the key data into the LSI." In contrast, the operation of the code in Collberg is NOT dependent on inputting the predicates. As mentioned above, the predicates are *previously* inserted into the code as a disguise and do not form key data (e.g., as a password) that would be inputted to obtain the correct code. Indeed, Collberg simply integrates correct and dummy code using the predicates, thereby hiding the correct code from reverse engineers. Accordingly, Collberg is at best cumulative to Johnson in that correct and dummy circuit design data are intertwined using the predicates as integrators. Collberg is unrelated to key data used to operate the correct code.

Indeed, as mentioned above and expressly disclosed in the last three lines of section 4.2 of Collberg, the alleged key data  $P^T$  (Figure 4C) "*always* selects the correct version of the code,  $S^a$ " (emphasis added) so as to evidence its "intertwining" functionality as opposed to its keying functionality; whereas, for example, according to one aspect of the present invention, a dummy circuit design can still operate without inputting the key data (e.g., inputting incorrect key data). Accordingly, it is respectfully submitted that the disclosed predicates of Collberg are not equivalent to the claimed key data.

In any event, Collberg does not provide any motivation or suggestion for applying the disclosed software-based code for use in an LSI design process. As set forth throughout Collberg, the disclosed code obfuscation technique is designed to "copyright" protect *software applications/code* (see, e.g., "Alice" example set forth in the Introduction). Outside of Applicants' specification, there is no suggestion in the cited prior art to bridge the technical gap existing between the software algorithm of Collberg and an LSI design process.

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The Examiner is directed to MPEP § 2143.03 under the section entitled "All Claim Limitations Must Be Taught or Suggested", which sets forth the applicable standard:

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. (citing *In re Royka*, 180 USPQ 580 (CCPA 1974)).

In the instant case, the pending rejection does not "establish *prima facie* obviousness of [the] claimed invention" as recited in claim 1 because the proposed combination fails the "all the claim limitations" standard required under § 103.

Based on the foregoing, it is respectfully submitted that all pending claims are patentable over the cited prior art. Accordingly, it is respectfully requested that the rejection under 35 U.S.C. § 103 be withdrawn.

New claims 24 and 25 are submitted to be patentable for reasons similar to those discussed above with respect to claim 1.

For example, claim 24 recites in pertinent part, "generating real key data and dummy key data, wherein the circuit design data is selected to operate as targeted with the real key data *and the dummy circuit design data is selected to operate with the dummy key data.*" As indicated above, Collberg does not provide dummy circuit design data that can be accessed with dummy key data. As expressly disclosed by Collberg and mentioned above, the dashed line path leading to the bugged code S<sup>b</sup> (Figure 4C of Collberg) is never accessed.

Claim 25 recites in pertinent part, "generating dummy circuit design *data having a same number of inputs and a same number of outputs as those of said circuit design data.*" Johnson and Collberg are completely silent as to the particular dummy circuit *design*, let alone suggest that recited in claim 25.

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**CONCLUSION**

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication for which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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